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STUDIES IN THE GENUS *THANAOS*

BY HENRY SKINNER, M.D., SC.D.

These butterflies for many years have presented great difficulties and have been stumbling blocks to students. In 1870, S. H. Scudder and Edward Burgess published a paper in the Proceedings of the Boston Society of Natural History, entitled, "On the Asymmetry in the Appendages of Hexapod Insects." In this paper they described eleven new species from genitalia alone. It seems that the remarkable asymmetry of the genital appendages was accidentally discovered. Their remarks on the subject are of interest. "In a recent study of the external genital organs of the males of butterflies we chanced to examine those of certain native species of *Nisoniades*, and found not only a great difference between allied species, but a most remarkable asymmetry between the opposite clasps of the same individuals; this has led to an examination of all the North American species of which we could obtain specimens for dissection and the results are embodied in this paper." This interesting and valuable essay has never received the study and attention it so well deserved and the attitude of students toward it has been somewhat peculiar.

W. H. Edwards in his Catalogue of Diurnal Lepidoptera, published in 1884 makes no mention of these species. In his Catalogue of Diurnal Lepidoptera of America North of Mexico, published in the Transactions of the American Entomological Society (1877) he says, "The species credited to Scudder-Burgess, were characterized solely from peculiarities in the genital armor. I do not regard such characterization as a 'description' entitling a species to recognition, and declined to admit these in the Synopsis. But in deference to Mr. Lintner's wishes I give them here as I would in exceptional cases give manuscript names. How valueless the genital armor is for specific distinctions may be inferred from the synonymy." His reference to the synonymy means that he put nearly all of the Scudder and Burgess species as synonyms of *juvenalis* Fabricius.¹ Strecker (Rhop. et Het. p. 118) refers to them as follows: "These separated from the old species and each

¹ In his 1884 Catalogue he says in regard to these names, "Described solely from the genitalia and not recognizable."

other only by a twist or two in the shape, or the millionth of an inch difference in the size of the organs of generation."

This was the general attitude of the students of butterflies at that period and even at present there are some persons who refuse to consider the genitalia of any importance in specific separation. One of my objects in studying the genus from a genitalic standpoint was to discover the amount of individual variation in a given species and then estimate their value for specific differentiation.

I was not sure that Scudder and Burgess had dissected enough specimens to determine the amount of individual variation in the species. That they did not, may be inferred from the fact that Dr. Scudder mistrusted some of their conclusions in their paper, as he subsequently put some of the species into the synonymy.

A number of years ago I wrote to him asking for the technic or method of extracting and mounting the genitalia for study. He replied that he could not tell me as all that part of the work had been done by Burgess who was dead. It will be noted that these slides or whatever form they are in, are the types of Scudder and Burgess of certain species of *Thanaos* and they have therefore become of considerable importance. I wrote to Mr. Samuel Henshaw asking if he knew where they were,² also to Mr. Charles W. Johnson³ and Dr. L. O. Howard.⁴

² "Museum of Comparative Zoölogy, Cambridge, Mass., Oct. 4, 1913. Scudder's microscopic slides were in considerable confusion when received at the Museum but I have at last searched without however finding any that can be considered types of any of the species described by Scudder-Burgess. I have also asked Burgess's brother thinking that the chance of any in the hands of the family should not be overlooked and here again I was disappointed. The only source I can think of is the Boston Society of Natural History. They have or had a microscopic collection and Burgess may have given them to the Society. Johnson should be able to let you know. I do not believe there is any chance of finding them in the U. S. National Museum though Burgess sold his Diptera to the Museum when Riley had charge and he may have included material other than Diptera."

³ "Boston Society of Natural History, Oct. 13, 1913.

I have looked over all of our microscopic slides and can find none that pertain to the Scudder-Burgess article on the genitalia of *Thanaos*."

⁴ "All the likely men have been consulted and search has been made, and the genitalia of *Thanaos* from the Scudder-Burgess types cannot be found. It is the recollection of both Mr. Schwarz and myself (and we were both here at the time) that the Burgess collection bought by Professor Riley contained only Diptera."

I mention this search trusting that calling attention to the matter will result in eventually finding the types. These species cannot be disregarded on the ground that they were described solely from the genitalia. There is no doubt whatever, that in a number of species, the genitalic characters are far more positive as a means of differentiation than the color and maculation. My own studies have shown that the individual variation in the genitalia is slight and that some species looking very much alike in color and markings have totally different genitalic structure. This is illustrated by *ice'us* and *brizo* and *juvenalis* and *horatius*. *Tristis* and *clitus* also are very much alike in appearance yet totally different genitally. Two species have been confused for years under the name *pacuvius*, yet they are very readily separated by differences in the sexual characters.

The method I have adopted for the study of the genitalia is a very simple one. The latter half of the abdomen is broken off and boiled for about two minutes in a ten per cent water solution of potassium hydrate (caustic potash). The genitalia are dissected out under water, by the aid of needles mounted in wooden handles. The parts are then put in 95 per cent alcohol and left there for at least an hour. They are then dried on a blotter, put on an ordinary glass slide, moistened with xylol and mounted in balsam damar in benzole, with the ordinary cover glass over the mount.

I have found the structure of the clasps or harpes quite sufficient as differential characters, but have also studied the other parts ("upper organ" and penis) as well and have found them useful for confirmatory evidence. The structure of the genitalia makes it difficult to mount the whole organ intact without distortion, or the possibility of having a different view in each specimen. I have therefore, wherever I found it necessary or expedient, mounted the various parts separately on the slide. More than one hundred slides have been made and they have all been numbered to correspond with the pin numbers on the insects.

Interesting genitalic studies of some of our species were made by Godman and Salvin and illustrated in the *Biologia Centrali-Americana* and their work was a step in advance. Dr. H. G. Dyar gives a synopsis of the species both from the maculation and genitalic standpoints.⁵ Mabilie in the *Genera Insectorum*, *Hesperidae*,

⁵ Journ. New York Ent. Soc., xiii, 120 to 122, 1905.

p. 79, gives a generic diagnosis and a list of the species. Dr. W. J. Holland, in the *Butterfly Book*, gives some good figures of some of the species and says, "The genus *Thanaos* is one of the most difficult genera to work out in the present state of our knowledge of the subject. The species are not only obscurely marked but they vary in the most extraordinary manner. Except by a microscopic examination of the genital armature, which can be carried on only when the student possesses considerable anatomical knowledge and an abundance of material, there is no way of reaching a satisfactory determination in many cases."

I have kept all the specimens of this genus collected or received in exchange and have also had access to the other collections that have become the property of the Academy of Natural Sciences of Philadelphia. This aggregation makes what I think is the largest and most complete collection of the genus extant. All the references to the literature of the subject have not been given in the following pages, but only those considered important or useful. This also applies to figures and illustrations, the best and most exact being chosen. The main object of the study is to aid students in the determination of these difficult butterflies.

The older authors in their descriptions attached great importance to the size and position of the vitreous spots on the primaries. As used they had very little value for specific differentiation. A careful study of the spots from large series of a given species would doubtless be of value in an effort to obtain the limits of individual variation. The sexes in *Thanaos* are very easily determined by the presence or absence of the costal fold of the primaries, as it is a male secondary sexual character.

Before we can have an absolutely stable specific nomenclature it will be necessary to absolutely fix the types. We do not know what some of the older species represent. The description of *juvenalis*, for instance, will not enable us to say whether it may not be *horatius* that was described by Fabricius. Indeed the description agrees better with *horatius* than it does with *juvenalis*. An examination of the genitalia of the type of *tristis* Boisduval would make an addition to our knowledge. *Pacuvius* may be *pacuvius* of authors, or may be an allied species described later.

It has always been supposed that the black-fringed species are all related to each other and that the white-fringed species form a

natural group of the species. Study of the genitalia shows that such is not the case, but that change in environment has brought about this different color in the fringe of the wings. This may be illustrated by an examination of the figures given. *Terentius*, a black-fringed species, is very nearly related to *funeralis*, a white-fringed species. At present I see no essential difference in harpes of the two although differences in the other parts may eventually be found. *Juvenalis* and *clitus* are very close to each other. *Lilius* and *pacuvius* are equally close, and in fact can only be separated by the color of the fringe. Additional material will be necessary to determine their exact relationship. The discovery that *burgessi* and *scudderi* are so different in the anatomy of the genitalia from *brizo* and *pacuvius* respectively has been a great surprise, and would not have been suspected had it not been for these studies. I have had specimens of both species for more than thirty years.

The text figures of the genitalia are merely outline drawings, made with the aid of the camera-lucida, of the harpes as they appear on the micro-slide. No attempt is made to show perspective or other details, including pilosity and bristles. The right and left given is in relation to the position or sides of the insect. There is generally a slit shown about the middle near the large appendage. This is a break in the chitin due to flattening on the micro-slide. Magnification twenty diameters. The magnification is the same as in the figures given by Scudder and Burgess. The drawings were made by Mr. E. T. Cresson, Jr.

Thanaos icelus Scudder and Burgess, Proc. Boston Soc. Nat. Hist., xiii, 288, 1870, figs. 3L, 3R, 3U (genitalia).

Lintner, Twenty-third Annual Report of the New York State Cabinet of Nat. Hist., Entomological Contributions, p. 162 (p. 30), 1872, pl. 7, figs. 5, 6, male.

Scudder, Butterflies Eastern U. S. and Canada, ii, 1507, 1889, pls. 9, 28, 77, 85.

Holland, Butterfly Book, pl. 48, fig. 17, male.

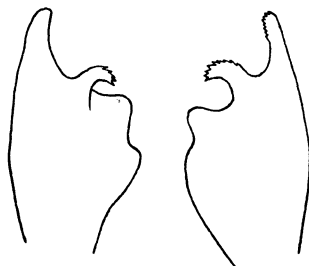
Male.—Expanse, 12 to 15 mm. Upperside. Primaries: outer half of fringe light brown, inner half gray; marginal line narrow and black; parallel to this a row of seven brown spots, extending from the costa nearly to the inner margin; crossing the wing beyond the disk is an irregular row of spots, the upper half composed of narrow lines and the lower of four rings; in the end of the cell is a small ring and another just below it, but not in the disk. The outer half of the wing is covered with grayish white scales, most

prominent beyond the cell and giving the appearance of a hoary spot. Secondaries light brown with about a dozen small light yellow spots. Underside. Primaries light brown with a row of six spots crossing the wing from the costa to near the inner margin. Secondaries light brown with the yellow spots of the upperside repeated.

The female is marked in a similar manner and expands from 16 to 18 mm.

Distribution.—From Northern Canada to Georgia and Florida. Westward to Colorado, Arizona and Washington.

Records.—Oldham, Nova Scotia, VII, 11; Beulah, Manitoba, V, 5; Johnstown and Elmwood, Rhode Island, V, 12 to 17; North Carolina; Georgia, IV, 21, (Abbot); Oakland County, Michigan, V, 25 to VI, 6; Southwestern Colorado; Silver Lake, Utah, VII, 15; Cloudercroft, New Mexico, V, 23; Olympia, Washington, V.



Thanaos icelus Scudder and Burgess.

This interesting little species is liable to be confused with *brizo* and its variety *somnus*. It is just possible the Florida records were *somnus*. It averages smaller in size than *brizo* and the prominence of the hoary scales at the end of the disk, between the bands, will usually serve to distinguish it. Scudder says that it is single brooded and appears as early as May 10th in New England. Lintner took it abundantly at Centre, New York, from the 9th to the 25th of June, his earliest capture being May 25th.

Thanaos brizo Boisduval and Leconte, Lep. Amer. Sept., 66, 1863. The male and female and the underside of the male are figured, also the larva and chrysalis.

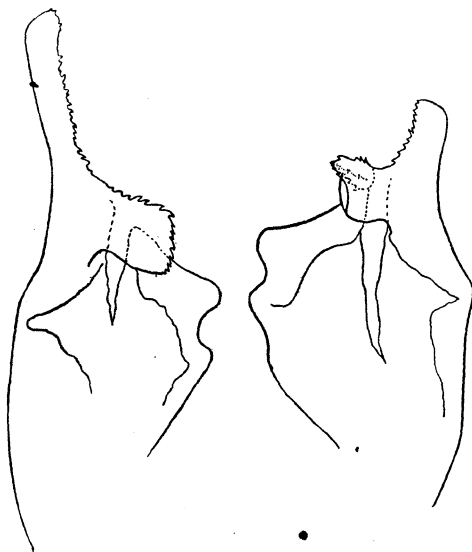
Scudder and Burgess, Proc. Boston Soc. Nat. Hist., xiii, 289, 1870. Figures and descriptions of the genitalia.

Scudder, Butterflies of the Eastern U. S. and Canada, ii, 1500, 1899. The species figured, also various stages and genitalia.

Holland, Butterfly Book, p. 332, pl. 45, f. 7, female. (1898).

Male.—Expanse 14 to 19 mm. Upperside. Primaries dark brown with a band of spots crossing the wing midway between the disk and the margin; these spots are centrally bluish-white scales encircled by wedge-shaped black lines; there is a similar band crossing the wing at the end of the disk but it is more obscure. The secondaries are dark brown with a double row of small, obscure, yellowish spots; these are usually more marked in the female. Underside. Primaries; there is a very obscure band of spots crossing the wing at the position of the disk. The spots on the secondaries are more distinctly repeated.

The female expands 17 to 19 mm. The area on the primaries at the end of the disk and between the two bands is usually much lighter in color in this sex and the spots on the secondaries are more pronounced.



Thanaos brizo Boisd. and Lec.

Distribution.—From Canada to Florida and from the Atlantic to Pacific oceans.

Records.—Beulah, Manitoba, V, 5; Vancouver Island, British Columbia, (James Fletcher); Framingham, Mass., V, 8; Arcola, Penna., V, 5; Westville, N. J., VI; Woodbury, N. J., IV, 29; Clementon, N. J., X, 5; Manumuskin, N. J., V, 8; Round Mountain, Blanco County, Texas, III, 25 to IV, 5; Durango, Colorado, V, 21; Stockton, Utah, VI, 1; Silver City, New Mexico, V, 8.

Boisduval (Ann. Soc. Ent. France, (2), X, 310, 1852) records the species from California. Other records: Halifax, Nova Scotia, (T. Belt and J. M. Jones); Quebec, V and VI, (A. F. Winn); Maine, (Fernald); Pittsburgh,

Penna., (Engel); New York, N. Y., (Beutenmuller); Michigan, (Newcomb); Omaha, Nebraska, IV and V, (Leussler).

Scudder says it is single brooded in the North. In southern New Jersey it is common in the dry sandy districts among scrub oaks.

var. *somnus* Lintner, *Papilio*, i, 73, 1881.

Described from one male and one female. *Type locality*.—Indian River, Florida. Types in the Edwards collection, Carnegie Museum, Pittsburgh, Penna. Holland, *Butterfly Book*, pl. 48, fig. 2, male.

Male expands (one wing) 15 to 18 mm.

"Dark brown in color, approaching *T. persius*. Primaries, without the antepical white spot above, and the large patch of bluish-white scales resting on the discal cross-vein of *T. icelus*. The black transverse bands are almost lost in the ground color. Secondaries, nearly as dark as the primaries, showing indistinctly the two rows of pale brown spots."

The female expands 17 mm. and is lighter in color than the male and has a conspicuous patch of whitish scales on the discal cross-vein.

It has thus far been found in Georgia and Florida only.

Records.—Thomasville, Georgia, III, 21 (Morgan Hebard); Georgiana, Indian River, Florida; Ormond, Florida, III, 27; Osprey, Florida, III, 11.

It appears to be a dark, smoky variety of *brizo*. I have been unable to find any essential difference between the genitalia of *somnus* and *brizo*. The females of the two differ more than the males in appearance. I have intermediates in color between the two from southern New Jersey (Clementon, April 24). *Brizo* and *somnus* differ as do some other butterflies that have a northern and southern range as for example *Papilio turnus*, *ajax*; *Limenitis archippus*.

Thanaos callidus Grinnell, *Ent. News*, xv, 114, 1904, figs. 1, 2, 3, genitalia. *lacustra* Wright, *Butterflies of the West Coast*, p. 253, 1905, pl. 32, figs. 480, 480a.

Grinnell, *Ent. News*, xvi, 339, 1905 (puts *lacustra* as a synonym of *callidus*).

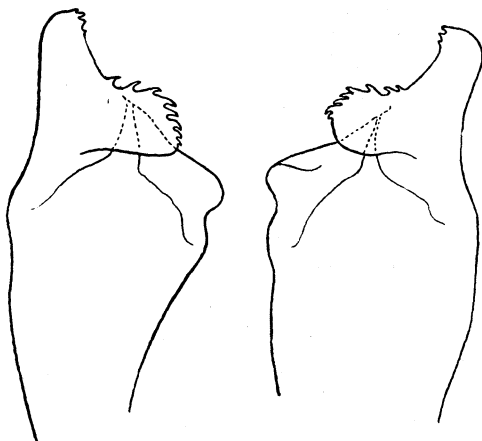
Callidus was taken on Mt. Wilson, Sierra Madre Mountains, Los Angeles Co., California. Altitude 5886 feet, June 6. The types of *lacustra* came from Blue Lakes, California, May 10. Dyar (*Journ. New York Ent. Soc.*, 13, 121, 1905) says, from an examination of the type, that *callidus* is a rather small, narrowly marked *brizo*, with dark ground color. All that I know of this species is the figure given by Wright. It appears to be closely related to *brizo* if it is not the same thing.

***Thanaos burgessi* new species**

This is allied to *brizo* and looks very much like it in color and maculation but has a different facies that is difficult to describe. Genitally it is quite distinct from *brizo*. The band of spots crossing the primaries in both species is less sagittate in the new species and the secondaries are more nearly immaculate. It has also a greyer look. There is a tendency for the fringes to whiten and in one specimen the fringe is almost entirely white.

Described from seven males and three females from Arizona. Two of these were taken in Arizona in 1883, by H. K. Morrison and the remainder by the same collector at Mt. Graham in that State in 1882. The single type, a male, in the collection of the Academy is from the latter locality.

There have also been tentatively associated with these, specimens from Stockton, Utah, VI 1, (Spalding); Silver City, New



Thanaos burgessi new species.

Mexico, V 18, (Gerhard); Durango, Colorado, V 21, (Osler); Platte Canyon, Colorado, V, (Osler). Named in memory of Mr. Edward Burgess who made the original genitalic studies of the genus.

Thanaos persius Scudder, Proc. Essex Inst., iii, 170, 1863.

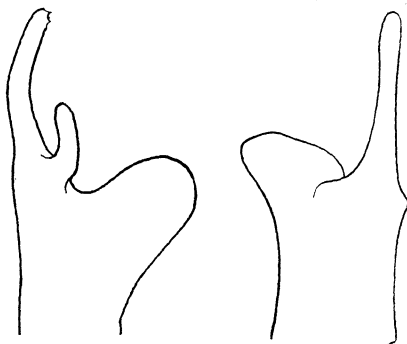
Scudder and Burgess, Proc. Bost. Soc. Nat. Hist., xiii, 286, 1870 (genitalia).

Scudder, Butterflies Eastern U. S. and Canada, ii, 1468, pl. 9, fig. 1, etc.

Holland, Butterfly Book, pl. 48, fig. 1.

Wright, Butterflies West Coast, 252, pl. 32, fig. 461, male.

"This species is spoken of by Harris as a local variety of *N. juvenalis*, but it is a distinct species; the distinctions mentioned by Harris in the spots on the wings are not persistent, but it differs from *N. juvenalis* in its smaller size, and in the fact that the male and female are exactly alike in the markings, while in *N. juvenalis*, the female differs from the male in having very much larger spots and in the marked ash-grey tints of the apical half of both primaries and secondaries above, differing so much as readily to be taken for a distinct species. *N. persius* has exactly the general appearance in coloration of the male of *N. juvenalis*; the distinction of the male and female is marked in Abbott's figures. The description of larva and chrysalis in Harris' Insects apply to this insect and not to *N. juvenalis*, as specimens in his cabinet show. Meadows, somewhat common; early August." (Original description.)



Thanaos persius Scudder:

Type Locality.—New England. Expanse. Male 14 to 17 mm., female 16 mm.

This species has a very wide distribution being found from Alaska to the Gulf of Mexico and from the Atlantic to the Pacific oceans.

Records.—Laggan, Alberta; Calgary, Alberta; Red Deer River, Alberta, VI, 20; Eagle, Alaska, VI, 3; Framingham, Mass., V, 11; Johnston, Rhode Island, VI, 17; Fite's Eddy, Penna., VIII, 20; Westville, N. J., IV, 9; Omaha, Nebraska, (Leussler); Round Mountain, Blanco County, Texas; St. Ignatius, Montana, VI, 28; Southwest Colorado, VII, 14; Fort Klamath, Oregon; Santa Cruz County, California, VII, 30; San Bernardino Mountains, California, VII, (Wright); Riverside, California.

var. *lucilius* Scudder and Burgess, Proc. Boston Soc. Nat. Hist., xiii, 287, 1870, figs. 2L, 2R, 2U.

Lintner, Twenty-third Report New York State Cabinet of Nat. Hist., 162, 1872 (Entomological Contributions, 32, pl. 7, f. 1, 2, 1872).

Scudder, Butterflies New Eng. and Canada, ii, 1458, pl. 9, f. 4, 1889.

Holland, Butterfly Book, pl. 48, fig. 10. (I think this represents *T. martialis*.)

Expanse. Male 14 mm., female 15 mm.

"Smaller than *persius*. Conspicuous cinereous patch enclosed between vitreous spots of the fore wings—scarcely more than indicated in *persius*. Lighter gray hue of apical half of fore wing, submarginal row of dark spots recedes less from outer border of lower half of fore wing than in *persius*." (Scudder, Butterflies New Eng., ii, p. 1462.)

The following distribution is given by Scudder. London, Ontario; Yellowstone Park; Holyoke Range, Amherst, Andover, Princeton, Boston, Springfield, Cape Cod, Wood's Hole in Massachusetts; New Haven, New Britain, Guilford, Connecticut; Michigan (Newcomb).

Lintner says it is a common species at Schoharie, New York and also gives the following data for captures during the year 1870. Bethlehem, Albany Co., New York, May 16, July 9, 28, August 26, September 9, 14. Centre, New York, July 6. On August 25 and 28, five butterflies were obtained from larvae collected at Bethlehem. September 9, young larvae were taken. He says there are two annual broods and possibly a third. The transformations are described (Lintner, Thirtieth Report of the New York State Museum of Nat. Hist., for the year 1876; Ent. Contributions no. 4, p. 67). Larvae reared on *Aquilegia canadensis*.

Strecker (Catl. Amer. Macrolep., 187, 1878) considered *lucilius* a variety of *persius*.

Scudder quotes Edwards as having reared it on pig-weed (*Chenopodium album*). He also figures the male in color (Butterflies E. U. S. and Can., iii, pl. 9, f. 4). Lintner in describing the species gives the following differences between it and *persius*. "The males of the two species are not liable to be confounded. In *persius* the anterior wings are of a uniform fuliginous hue, and consequently much less conspicuously marked than those of *lucilius*. The hyaline spots are smaller and less constant. Very rarely are there two of these spots present between the median nervules; often the apical ones only appear, and occasionally these are obsolete."

Beutenmuller (Bull. Am. Mus. Nat. Hist., v, 300, 1893) gives descriptions of the larvae and chrysalis, and the food plants as Wild Columbine (*Aquilegia*) and *Chenopodium*.

Lucilius and *persius* compared. I have never been satisfied that we had two species represented by these names. The records and distribution given for them would seem of doubtful value as

evidence of two species on account of the difficulty of differentiation and the probability of misidentification. The difference in the recorded food plants may mean much or it may mean nothing as butterflies have a number of food plants. Further studies of the life histories appear necessary to establish specific identity. The only tangible differences I can find to separate them are first—*lucilius* is smaller; second—If a line be drawn from the costal vitreous spots to the inner margin it will divide a lighter colored area. On the inner side this gives the appearance of a lighter spot which is absent or faintly indicated in *persius*.

The question of broods is not settled as there are late records for *persius*. The vitreous spots vary alike in each and give no help. There may be none, one or two, below the costal spots, in both *lucilius* and *persius*. I have not been able to discover any tangible differences in the genitalia of the two and must conclude that the question as to whether we have to deal with a single species and a variety, or with two species, is still in doubt.

var. **afra**nus Lintner, Thirtieth Report N. Y. State Cabinet of Nat. Hist., 175, 1878 (Ent. Contributions No. 4, p. 63, 1878).

Elrod, Butterflies Montana, p. 150, fig. 110.

Biologia Centrali-Americana, Lepid., ii, 459, tab. 91, figs. 24, 25, 26.

"Thorax and abdomen above, black; beneath, with brown hairs. Palpi clothed with long brown hairs. Legs fuscous. Primaries with the costal margin nearly as straight as in *N. persius*, but rounded toward the apex; moderately bent basally. Outer margin more rounded than in any male *Nisoniades* known to me (the females, as a rule, having more rounded wings), as much so as in *N. brizo* female. Inner angle rounded, with internal margin short. The usual black markings in the basal region of the wing; the remainder clouded with brown, distinctly relieving the transverse line of elongated black spots and the row of rounded submarginal black spots; a few gray scales are sprinkled over the brown ground. The black spots of the transverse band above vein two are more elongated in proportion to their width, more acute toward the outer margin, and more sharply defined than in any other species—even than in *N. ausonius*. The line of four small, anteapical, white, hyaline spots is sensibly drawn inward toward the base, so that an imaginary line traversing these spots will cut the outer margin within its apical half. A white hyaline spot rests on the black spot in cell three, and the three black spots in cells two and one b, have some gray scales centrally. There is a trace of a small whitish, hyaline, discal spot. The terminal margin is without the black line seen in *N. martialis*. Secondaries, dark umber-brown with the two rows of brown spots, similar to those in *N. persius* female. Wings beneath, a rich umber-brown, showing on the primaries the discal and anteapical spots more

plainly above, and a white spot each in cells three and two. The rows of pale brown spots on the secondaries are strongly relieved by the dark ground. The margins of the wings bear a black marginal line, obsolete toward the apex of the primaries. Expanse of wings 1.10 inch; length of body 0.48 inch. Habitat Colorado." Described from a single example.

I am unable to separate this from *persius*. Differences in the genitalia have not been found. It may be considered a light colored variety of *persius*.

Records.—Yosemite, California (Dyar); Arizona, 1883, (Morrison); Prescott, Arizona, VII, VIII, IX; Northern Sonora (Morrison).

var. **pernigra** Grinnell, Ent. News, xvi, 14, 1905.

"Upperside: primaries entirely blackish-slate, with a very thin sprinkling of grayish hairs; three very small, white dots arranged diagonally, in the costo-apical part of the wing. Secondaries: entirely seal-brown, with long hairs along the inner margin and basal part of wing. Underside of both wings entirely Van Dyke brown; three costo-apical white spots visible through the wing. Abdomen and thorax same color as adjacent parts of the wings. Palpi clothed with long hairs. Antennae entirely of same color as the primaries on the upperside.

Habitat: Mt. Tamalpais, Marin Co., California. Collected by Mr. F. X. Williams, May 19, 1904, in Mill Valley, on the slopes of Mt. Tamalpais. Only a few were captured but others were seen; the species is no doubt extremely local in distribution. Type I male, to be deposited in the collection of the California Academy of Sciences."

"This species is very distinct from any other by its small size, and very dark, almost uniform color. Owing to a curious asymmetry in the clasps of the single male I possess, the description of these organs will have to be deferred till more specimens are available."

Of course the asymmetry Grinnell describes is the normal condition in this genus. We have two males from the type locality taken May 27 and 28 and presented by Mr. F. X. Williams. *Pernigra* is evidently a dark form of *persius*. Dyar (Journ. N. Y. Ent. Soc., XIII, 121, 1905) says *pernigra* represents the eastern *persius* in California, but is separable therefrom by the very dark coloration.

Thanaos lilius Dyar, Proc. U. S. National Museum, xxvii, 788, 1904.

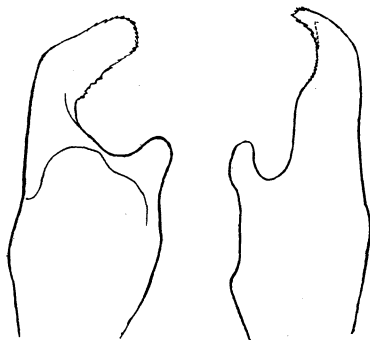
"Two specimens, May 31, June 4. This form resembles *lucilius* Lintner, but is larger, the wing more variegated with brown, which shows distinctly in a patch at the end of the cell, cut by an erect dark line on the cross vein. Otherwise it is very similar. The size is that of *martialis*, but the markings are diffused and not as contrasted as in that species. It is the western representative of *lucilius*, probably a geographical race of it, but is as much entitled to specific rank as several other species of the genus. I have speci-

mens from Easton, Washington (Koebele), and Yosemite Valley, California, June 16th and August 5th (Dyar). Type. Cat. No. 7333, U. S. National Museum." (Original description.)

Dr. Dyar's specimens were from the Kootenai district of British Columbia. Our specimens were received from Mr. J. W. Cockle and were taken at Kaslo, B. C. June 20 (male) and June 5 (female). Also a specimen from Fort Klamath, Oregon. We also have a specimen from Westville, New Jersey, that is almost identical with the Kaslo specimens. The genitalia are like those of *pacuvius* and it is also like the latter in maculation except that the fringe is black.

Thanaos martialis Scudder, Trans. Chicago Acad. Sci., i, 335, 1869.

"This butterfly is most nearly related to *N. persius* Scudder, and agrees with it in size; it differs from it in the great distinctness and definition of the darker markings upon the upper surface of the wings; in the distinctness with which the markings of the under surface of the secondaries can be seen upon the upper surface; in the sagittate character of the submarginal row



Thanaos martialis Scudder.

of spots upon the under surface of the secondaries; and in the usually brighter color of the tips of the antennae. The specimens were taken on the open prairie and were most abundant in the latter part of July. 9 males, New Jefferson, July 21-24th. One male, lower half of Dallas county, in the early half of August (worn)." (Original description.) The localities given are for the state of Iowa.

Expanse. Male, 13 to 15 mm. Female 16 mm.

Distribution.—Atlantic states to Florida. Westward to Colorado and Arizona.

Records.—Centre, New York, V, 3 and 27, VI, 11; Harvey's Lake, Penna., VI, 16; Reading, Penna., VII, 29; Woodbury, N. J., IX, 5; North Carolina;

Fulton County, Georgia, VII, 14; Omaha, Nebraska, V and VII, (Leussler); Chimney Gulch, Colorado, VI, 20, (Oslar); Clear Creek Canyon, Colorado, VI, 11, (Oslar); Mount Graham, Arizona.

Thanaos ausonius Lintner, Twenty-third Report New York State Cab. Nat. Hist., 166, 1872, figs. 11, 12, pl. 7.

Cook (Journ. New York Ent. Soc., xv, 125, 1906), puts *ausonius* as an aberration of *martialis*. There is no doubt but that Mr. Cook is correct in this. *Ausonius* has never been found since it was originally described.

Thanaos juvenalis Fabricius, Ent. Syst., iii, 339, no. 291, 1793.

Butler, Catl. of Diurnal Lep. described by Fabricius, in the collection of the British Museum, p. 287, 1869. ("Georgia. From Mr. Milnes' collection." British Museum.)

Smith and Abbot, Ins. Georgia, pl. 21, 1797. (A male *Thanaos* is figured and is like *brizo* and has no vitreous spots. The female figured may be *horatius*, *juvenalis*, etc. The larvae is figured.)

Boisduval and Leconte, Lep. Amer. Sept., t. 65, f. 1, male, f. 2 (underside), fig. 3, female, f. 4, larva, f. 5, chrysalis. This represents *juvenalis* as treated in the present paper.

Scudder and Burgess, Proc. Bost. Soc. Nat. Hist., xiii, 279, 1870 (genitalia).

Scudder, Butterflies East. U. S. and Can., ii, 1476, pl. 9, f. 13, 14, 1889.

Holland, Butterfly Book, pl. 48, fig. 11, female.

Wright, Butterflies West Coast, pl. 32, f. 462 (probably the female of *proper-tius*).

ennius Scudder and Burgess, Proc. Bost. Soc. Nat. Hist., 13, 296, 1870 (genitalia).

The original description of *juvenalis* is as follows . . . "Alis ecaudatis fuscis: anticis atro maculatis alboque punctatis. Habitat in America. Dom. Jones. Statura omino *H. Flefti*. Alae omnes supra fuscae.

Anticae maculis atris punctisque albis, sparsis, posticae striga submarginali e maculis cinereis, puncto atro notatis, subtus concolores.

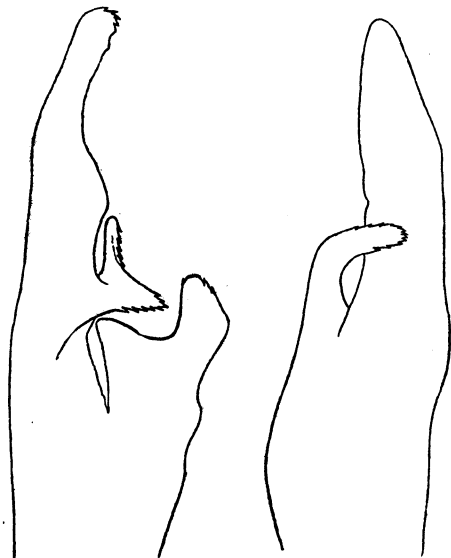
Papilio juvenalis. Jon. fig. pict. 6. tab. 78. fig. 1."

Wings dark brown without tails. Anteriors with black spots and white points. Size of *H. flefti*. All wings fuscous above. Anteriors with black spots and a few white points. Posteriors with submarginal streaks and cinereous spots, marked with a black dot, below concolorous. (Translation.)

Distribution.—Vancouver; Ontario; Quebec; Maine to Florida; Mississippi Valley.

Records.—Framingham, Mass., VI, 4; Cumberland Mills, Rhode Island, V, 11; Johnston, Rhode Island, V, 21 to 25, VI, 17; Philadelphia, Penna.; Pittsburgh, Penna.; IV, 23; South Amboy, N. J., V, 5 to 15; Riverton, N. J., V, 9; Camden, N. J.; Westville, N. J., IV, 3; Clementon, N. J., V, 5 to 18; Iona, N. J., IV, 30; Manumuskine, N. J., V, 8; North Carolina; Thomasville,

Georgia, III, 25, (M. Hebard); Biscayne Bay, Florida, (Mrs. Slosson); Carbondale, Illinois, IV, 15; Omaha, Nebraska, IV, 3 to IX, 7, except VII, (Leussler); Highrolls, New Mexico, VI, 13.



Thanaos juvenalis Fabr.

Thanaos propertius Scudder and Burgess, Proc. Bost. Soc. Nat. Hist., xiii, 298, 1870 (genitalia).

tibullus Scudder and Burgess, l. c., p. 299.

Lintner, Papilio, i, 71, 1881.

Wright, Butterflies West Coast, p. 252, pl. 32, fig. 463.

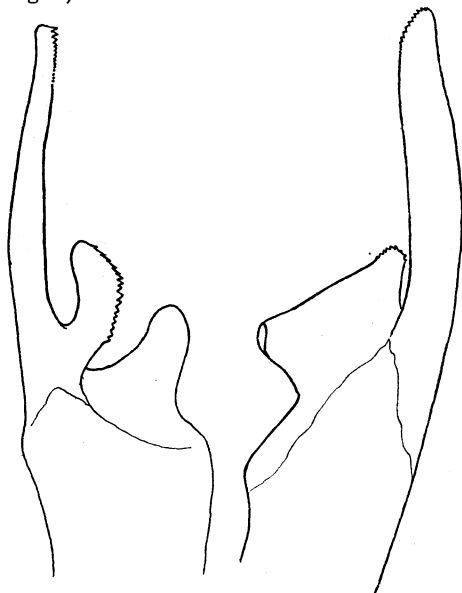
"Size of *N. juvenalis*; the primaries more pointed; the submarginal row of sagittate and black spots is more oblique, being more drawn inwardly toward the base as it approaches the internal margin, whence it follows that, while in *juvenalis*, of the two subelliptical whitish spots in cell 1b, the lower one is as near to the outer margin as that in cell 3; in this species it is always further removed. The hyaline spot in the discal cell is smaller than in *N. juvenalis* and is much less conspicuous underneath. Of the four costapical hyaline spots, 1, 3 and 4 are in line, or 3 is somewhat nearer to the base of the wing; 2 is nearer the apex and is elongated. The thorax and abdomen are fuscous, instead of umber-brown. In general color it is darker, more approaching *N. persius*—the black spots not offering so strong a contrast with the ground as in *N. juvenalis*; the primaries are nearly covered with bluish hairs, which is perhaps the best characteristic feature of the species."

This is Professor Lintner's description from the material in the Scudder collection. He says it is very doubtful if the genitalic

form *N. tibullus* of Scudder and Burgess can be separated from *propertius*.

Distribution.—The original description cites California as the locality. Lintner says he examined eight examples in the Scudder collection, two from Mokiah Pass, Palmer Collection; one from Sierra Nevada; four from California; one from the Juniper Mountains. I do not know where Mokiah Pass is. There are Juniper Mountains in Oregon, Nevada and Arizona.

Records.—Southwestern Colorado, VII, (Oslar), (Tolman); Payson Canyon and Stockton, Utah, VII 4, (Spalding); Corfield, Vancouver, V, 12 to 19; Umatilla, Oregon; California.



Thanaos propertius Scudder and Burgess.

Thanaos horatius Scudder and Burgess, Proc. Bost. Soc. Nat. Hist., xiii, 301, 1870 (genitalia).

Scudder, Butterflies N. England and Can., ii, 1486, pl. 9, f. 7, 10, 1889.

Holland, Butterfly Book, pl. 48, f. 15. This is a female and probably does not represent the species.

virgilius Scudder and Burgess, Proc. Bost. Soc. Nat. Hist., xiii, 302, 1870 (genitalia).

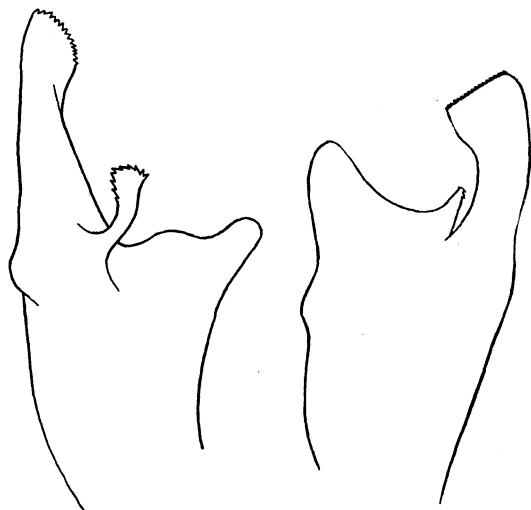
petronius Lintner, Papilio, 1, 70, 1881.

Lintner's description of *petronius* ends with the following comparisons: "Described from four males and one female from the Indian River, Florida.

This is the largest species known to us in the genus. It is separable from *N. juvenalis* and *propretius* by its darker color, less distinct ornamentation, less rounded wings, absence of the white spots of secondaries in cells six and seven. From *N. naevius* with which it is associated, it is distinguished by its larger size, more distinct markings, and contrasting lighter shade of the palpi."

Distribution.—From Connecticut to Texas and westward to Missouri, Colorado and Arizona.

Records.—Amherst, Foxboro, Andover and Boston, Mass.; Avon, Hartford County, Connecticut, (R. C. Williams); New Haven, Connecticut; Beaver Dam, Pike County, Penna., VII, 17; Little Log Tavern, Pike County, Penna., VII, 20; Childs Park, Pike County, Penna.; Philadelphia, Penna., VII, 17; Elizabeth, N. J., VIII, 8; Jamesburg, N. J., VII, 4; Mount Holly, N. J., VII, 4; Westville, N. J., IV, 30; Woodbury, N. J., V, 4; Atco, N. J., IX, 4; Manumuskine, N. J., V, 8; Maryland; District of Columbia;



Thanaos horatius Scudder and Burgess.

Cranberry, N. C., VII, 4 to 8, (Thomas); Wilmington, N. C., III, IV, 26, Isle of Pines, South Carolina, VII; Thomasville, Georgia, III, 18 to 21, (M. Hebard); Central Florida; Indian River, Florida; Georgiana, Florida; Miami, Florida, I, 4, II; Nashville, Tennessee, VI, 20; Dakota; Omaha, Nebraska, VII, IX, X, (Leussler); Eureka Springs, Arkansas, VII; Mississippi; Round Mountain, Texas, IX, 4; Durango, Colorado, VII, (Oslar); Prescott, Arizona, VII, 8 to VIII, 4.

The type localities were New England and Texas.

This is a very common species in southern New Jersey. It has been confused with *juvenalis*.

Thanaos terentius Scudder and Burgess, Proc. Bost. Soc. Nat. Hist., xiii, 292, 1870.

Scudder, Butterflies New Eng. and Can., ii, 1490, pl. 9, f. 15, 1889.

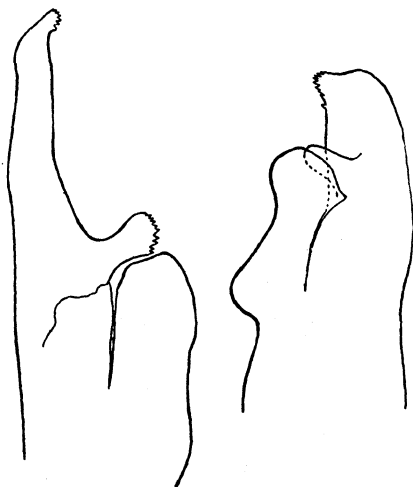
ovidius Scudder and Burgess, Proc. Bost. Soc. Nat. Hist., xiii, 295, 1870.

naevius Lintner, Papilio, i, 69, 1881.

Lintner in his description of *naevius* says, "This may possibly be the *N. terentius* of Scudd.-Burg., based on the genital armature; but as the differences presented between the genitalia of this species, which have been carefully observed, and those of *N. terentius* as described and illustrated, are greater than those which serve to separate other of the genitalic species, it would not be proper to accept the two as identical."

The males (one wing) expand 16 to 18 mm.

This is a dark, smoky species with none, one, or sometimes two small vitreous spots, below the ordinary costal series, the latter



Thanaos terentius Scudder and Burgess.

numbering, sometimes three and sometimes four, otherwise the wing is nearly immaculate. The species is very close to *horatius* in appearance, but the latter is larger, lighter in color and the markings less obscure. The type locality was Florida and the types of *naevius* Lintner were three males collected at Indian River, Florida.

Distribution.—According to Scudder the species is found from Connecticut and Massachusetts to Florida.

Records.—Wilmington, North Carolina, VII, 13; Morganton, North Carolina, (Morrison); Isle of Pines, South Carolina, VII; Atlanta, Georgia; St. Augustine, (Johnson); Sanford, Key West, Miami, I, 20 to 30, II, 6,

Florida; Texas. Also specimens from Georgiana, Indian River, Florida; Omaha, Nebraska, IV, V, VII, IX, (Leussler).

Thanaos pacuvius Lintner, Thirtieth Annual Rept. New York State Museum Nat. Hist., 1876 (Entomological Contributions, No. 4, p. 60, 1878). Godman and Salvin, Biol. Cent. Amer., Lepid., ii, 458, 1899, t. 91, figs. 16, 17, male.

Holland, Butterfly Book, pl. 48, f. 9, female.

"Head and palpi thickly clothed with bristling brown and gray hairs, the obtuse tip of the third joint of the palpi only visible; antennae brown above, the joints bordered with white beneath and within. Thorax and abdomen beneath with long brownish hairs; legs brown with pale hairs at their joints. Wings approaching those of *N. persius* in shape, but the primaries somewhat narrower.

Primaries umber-brown, mottled with black as in *martialis*; near each extremity of the cell, conspicuously marked with a large black spot, the outer one having the hyaline white cellular spot on its outer margin. A row of black spots cross the nervules, upon which are the following white hyaline spots; four costo-apical ones, of which the costal one is scarce more than a dot, the second the largest and quadrate, the third and fourth quite small with their longest diameter in the direction of the breadth of the wing; in cells two and three each, a triangular spot with the apex directed toward the outer margin of the wing—that in cell two but partially hyaline; in cell 1b, two triangular spots (not hyaline), marked with white scales so obscurely in the somewhat imperfect specimen, that possibly they may prove to be a constant feature. Some white hairs and scales separate this row of black spots from a subterminal row of rounded black spots, which is again separated by a few similar white scales from the black terminal margin. Fringes umber-brown, their base cut by some white scales projected from the black margin.

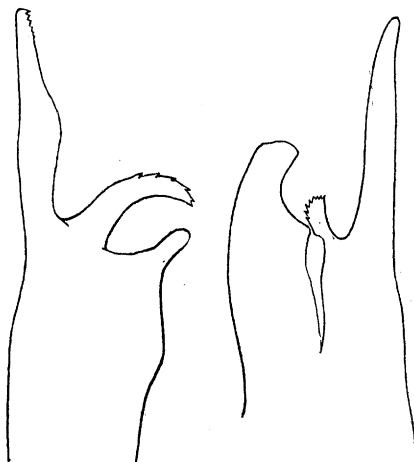
Secondaries fuscous, faintly marked by some brown spots and an indistinct subterminal row of brown dots. Fringes snow-white with some brown-scales of the terminal margin cutting their base, and at the apical angle of the wing, extending nearly to their outer edge.

Beneath, primaries pale brown, the hyaline spot in cell 3 showing conspicuously, and with white scales covering the extreme apical portion of the wing. Secondaries reddish brown basally and medially, with a double row of pale brown spots before the outer margin between veins 1b and 4. Fringes as above. Expanse of wings 1.38 inch. Length of body .58 inch. Habitat, New Mexico. Described from one male in the collection of Mr. W. H. Edwards." (Original description).

"This species may be recognized among all those of the genus known at present, by the white fringes of the secondaries, less sharply defined at their base than in *N. tristis*, by its smaller size, less pointed primaries and a less projected anal angle of the secondaries than in that species" (Lintner).

Distribution.—I have only seen this species from Colorado, New Mexico and Arizona. It appears to be two brooded.

Records.—Chimney Gulch, Golden, Colorado, IV, V, (Oslar); Platte Canyon, Colorado, VIII (Oslar); Southwestern Colorado, (Tolman); Mt. Graham, Arizona (Morrison); Carr Canyon, Arizona, VIII (Skinner); Reef, Arizona, IX, (Biederman); Jemez Springs, New Mexico, VI, 13 to 26, (Woodgate).



Thanaos pacuvius Lintner.

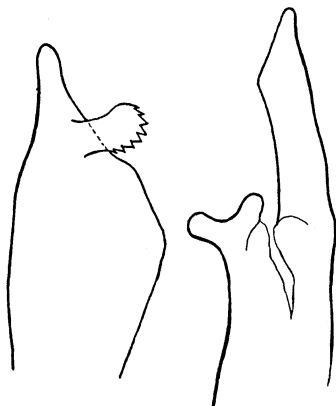
***Thanaos scudderi* new species**

Male.—Expanse 9.5, 12.5, 13.5 mm. One of the specimens is probably abnormally small (9.5 mm). Upperside. Primaries with the usual four costo-apical vitreous spots, and below these a single spot and another at the end of the discoidal cell. The markings are otherwise essentially those of *pacuvius* and *clitus* except that the latter two usually have two spots below the costal four. The secondaries are dark brown with white fringes. The undersides of the wings are marked in the usual way and present no marked difference from the allied species. The genitalia show that this is a very distinct species and readily separated from the others. A large series may show good maculation characters to separate it from *pacuvius*.

Described from five specimens taken by H. K. Morrison, at Fort Grant, Arizona in 1883.⁶

⁶ "Morrison's sets, when sent abroad, were usually labelled 'Sonora,' and have thus been included in the Biologia Centrali-Americana. When sent to American workers, however, they are labelled 'Arizona.' They were probably all made, however, in the Graham Mountains, near Ft. Grant (Arizona), and above Ft. Huachuca." Schwarz, Proc. Ent. Soc. Wash., iv, 209, 1897.

The type, including the genitalic mount, is in the collection of the Academy of Natural Sciences of Philadelphia.



Thanaos scudleri new species.

Thanaos tatus Edwards, Papilio, ii, 179, 1882.

Edwards, Papilio, iii, 65, 1883.

Male.—Expands 1.6 inch. “Upper side of primaries umber-brown, blackish on disk and to base, the outer limb free from white scales; on outer edge of disk towards costa a light brown patch; on costa four sub-apical silvery dots, in a zigzag line; one such dot in upper median interspace, and one, rather obscure, against end of cell; along hind margin a row of small patches of bluish-white scales; the usual (in this genus) extra-discal band is made up of large lanceolate and elongated black spots, separated, each edged on the outer sides by bluish-white scales, which scales form a conspicuous serrated line across the wing.

Secondaries black-brown with an indistinct series of lighter patches beyond the disk; fringes of primaries concolored; of secondaries white, cinereous at outer angle.

Under side of primaries lighter, the spots repeated, the one against cell distinct; along hind margin a row of white points, and at inner angle a white patch; beyond the disk an indistinct series of whitish patches, almost obsolete in the middle of the wing; the apical area dusted white. Secondaries uniform blackish-brown; along the edge of hind margin a macular white band, represented by dots on the upper half.

Body above dark brown, beneath same, but the thorax with many grey hairs; legs dark brown with dull white hairs interspersed; antennae black, on the underside ringed white; club black above, under side and tip ferruginous. From a single male. This fine species is readily distinguished from any of the white-fringed allies by the pure brown color of the marginal area of primaries, with no dusting of white, and by the conspicuous extra-discal band and its whitish serrated edging.” (Original description.)

Type locality.—Mt. Graham, Arizona. The type of this species is not in the Edwards collection, now in the Carnegie Museum at Pittsburgh, Penna. I do not know this species.

Thanaos clitus Edwards, Papilio, ii, 180, 1882.

Edwards, Papilio, iii, 65, 1883.

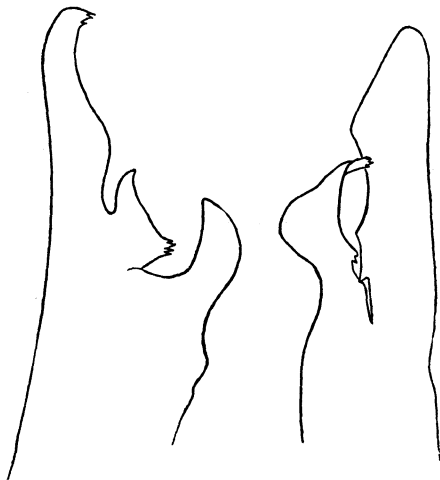
maestus Godman and Salvin, Biol. Cent.-Amer., Lepid., ii, 457, 1889, pl. 91, fig. 18, male.

tristis Staudinger (not Boisduval), Exot. Schmett., pl. 100.

Holland Butterfly Book, pl. 45, f. 8, male.

Wright, Butterflies West Coast, pl. 32, no. 464 is the female of *funeralis* and not *clitus*.

"*Male*. Expands from 1.5 to 1.7 inch. Upper side of primaries umber-brown so much dusted with whitish scales and clothed with white hair as to



Thanaos clitus Edwards.

discover the ground color only in small patches, as along the hind margin, and also a little within the margin and on basal area the usual extra-discal spots are black, on the upper half of the wing long, acute, below broad, lanceolate; on middle of disk a broad, black cross band, reaching inner margin, and the basal area is mottled with black; a clear brown, but not well defined patch, at end of cell; on costal margin four sub-apical diaphanous dots, three in straight line, the fourth a little inside; a similar dot in upper median interspace, and one at the end of cell. Secondaries uniform, black-brown; fringes of primaries black-brown, of secondaries white, cinereous at outer angle.

On under side the spots are repeated, a little enlarged; primaries have a marginal row of white points, sometimes meeting; also an extra-discal series of light-brown patches more or less dusted with white scales; in some ex-

amples, however these also are wanting, unless next inner margin, and the whole limb is thinly white, through which runs a submarginal series of brown patches; in all cases there are many white scales over apical area. Secondaries immaculate, except for a few whitish points along posterior part of hind margin, which sometimes are developed into a white macular band. Body above black-brown, thorax and abdomen beneath grey-brown; legs dark brown, with ferruginous hairs on under side; palpi dark brown, the tips of the hairs whitish; antennae black, on under side slightly annulated white; club black above, ferruginous below and at tip. From six males. This species is allied to *tristis* Bd."

Type locality.—Mt. Graham, Arizona (Morrison).

All my specimens are from Arizona, most of them from the type locality. The Mexican localities mentioned in the *Biologia* are Pinal and Puebla. Godman and Salvin also had Arizona material taken by Morrison.⁷ A single pair recently received are from Chimney Gulch, Golden, Colorado, VI, (Osler).

Thanaos tristis Boisduval, Ann. Ent. Soc. France, (2), x, 311, 1852.

Scudder and Burgess, Proc. Bost. Soc. Nat. Hist., xiii, 303, 1870 (genitalia).

Lintner, Thirtieth Report New York State Mus. Nat. Hist., 173, 1878 (Ent. Contributions, 4, 62, 1878).

Godman and Salvin, Biol. Cent.-Amer., Lepid., ii, 457, t. 91, f. 15 (male genitalia).

Wright, Butterflies West Coast, p. 253, pl. 32, f. 469. This represents a male and not a female. It may or may not be *tristis*.

Oberthür, Études Lép. Comparée, ix, pt. 1, pl. 240, fig. 2081.

"Wings dark fuscous; the superiors with a central spot, transverse, whitish; the inferiors with a white border. It has the shape and size of *juvenalis*. Wings dark brown, with the border of the inferiors white. The superiors with a few darker undulations, as in the allied species and presenting on the middle a small whitish spot, followed by a curved line of six similar points, separated into two groups, the one of four, near the edge, the other of two, below the median nervure. The under side paler than the upper. In this species, as in *juvenalis*, the small points are placed on some obscure nervures. From California." (Translation of original description.)

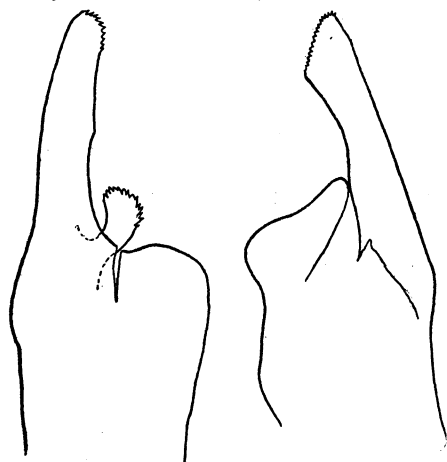
Distribution.—California, Arizona and Texas.

Records.—Fairfax, Marin County, California, IX, 12, (Huguenin); Santa Cruz, Mts., Santa Clara County, California, IX, 1, (Huguenin); Palo Alto, California, IX, 22; Ben Lomond, California, IX, 20; Arizona, (H. K. Morrison), 1883; Goldwad, Arizona, X, 25, (Haskin); Southern Arizona, (Poling).

Genitalia from specimens I have examined agree with the figures of the genitalia figured by Scudder and Burgess and Godman and Salvin. *Funeralis* is such a common species in California that I

⁷ See footnote on page 215.

thought that *tristis* Boisduval might be the same as the *funeralis* of Scudder and Burgess, but since Mons. Oberthür has figured the type of *tristis* we can be reasonably certain that no error has been made, although to make the matter absolutely certain an examination of the genitalia of the type of *tristis* should be made. The fixation of a single type has become a necessity for systematic work. The following interesting communication has been received from Mr. F. D. Godman, "I have lately received from Mons. Oberthür his fascicule 9, *Études de Lépidopterologie Comparée* and have in it read your letter to him. I see you are in some doubt whether *Thanaos funeralis* Scudder, is not the same as *T. tristis*



Thanaos tristis Boisduval.

Boisd. In the 'Biologia' I figured the genitalia of the two species which, as may be seen, t. 91, differ considerably. The only point was whether I had the true *T. tristis* from Durango (Mexico) and I therefore figured a male Californian specimen, having only Mexican females. Mons. Oberthür's figure of *tristis* (type) is identical with my Californian specimens dissected, and I therefore think there can be no doubt about the distinctness of the two species. I hope this note may help to solve your difficulty."

Thanaos funeralis Scudder and Burgess, Proc. Bost. Soc. Nat. Hist., xiii, 293, figs. 7L, 7U, 7R, 7Ub, 7Rb. 1870. Described from genitalia alone. Type locality: Texas.

Lintner, Thirtieth Report New York State Mus. Nat. Hist., 173, 1878 (Ent. Contributions, 4, 61, 1878).

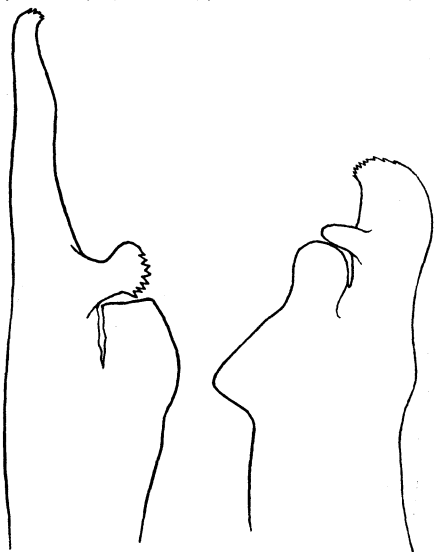
Godman and Salvin, *Biologia Cent.-Amer.*, Lepid., ii, 456, t. 91, figs. 10, 11, 12, male, 13, 14, female.

Holland Butterfly Book, p. 336, pl. 48, fig. 12, male.

Wright, *Butterflies West Coast*, pl. 32, f. 468, female and fig. 464, female (not *clitus*).

Distribution.—Colorado, Utah, New Mexico, Arizona, Texas, California; Mexico; Central America; Colombia.

Records.—Platte Canyon, Colorado, V, VII, (Oslar); Chimney Gulch, Golden, Colorado, VI, (Oslar); Southern Utah, (Poling); New Mexico, (Snow); Bastrop, Texas, (Lintner); Round Mountain, Blanco County,



Thanaos funeralis Scudder and Burgess.

Texas, VI, 23, (Schaupp); New Braunfels, Texas, (Schaupp); Southwestern Texas, (Aaron); Rio Grande, Texas, (Lintner); Jerome, Arizona, IX, 9, (Haskin); Goldwadi, Arizona, IX, 19, (Haskin); Florence, Arizona, (Biederman); Reef, Arizona, X, 11, (Biederman); Carr Canyon, Huachuca Mountains, Arizona, VIII, (Skinner); Mount Graham, Arizona, 1882, (Morrison); Los Angeles County, California, IV; Soldiers Home, Los Angeles County, California; Burbank, California, IV, 9, (Haskin); San Bernardino, California, VI; San Diego, California; Nogales, Sonora, Mexico, VIII, 12, (Calvert); La Joya, Mexico, VIII, 10, (Hoag); Colima, Mexico.

The early date of the Colorado record may be incorrect.

Expanse 17, 19, 20 mm.

This species is appropriately named as it is very dark and sombre looking with few markings and has a conspicuous pale patch on

the primaries beyond the cell. The white fringe on the under side of the secondaries extends to the apex of the wing. It has a much wider distribution than was formerly supposed. It would be interesting to know its northern limit in California and its relation to *tristis* from the standpoint of distribution.

Nisoniades plautus Scudder and Burgess, Proc. Bost. Soc. Nat. Hist., xiii, 304, 1870, figs. 16L, 16R, 16Lb, 16Rb.

Type locality.—Florida. From the peculiar construction of the right harpe (fig. 16R) I doubt that this species belongs to the genus *Thanaos* and at present I have been unable to recognize the species.

Nisoniades llano Dodge, Can. Ent., xxxv, 78, 1903.

Dyar (Journ. New York Ent. Soc., xiii, 119, 1905), says he examined the type of *llano* and the species was *Chiomara gesta* Herrich-Schaeffer. See Biol. Cent. Amer., Lepid., ii, 455, t. 91, figs. 7, 8, 9, male. *Distribution*.—Texas, Mexico, Central America, South America, Cuba, Jamaica.

Nisoniades protillo Lucas, Sagra, Hist. Cuba, 461, 1856.

Doll, Ent. News, xv, 351, 1904. Brownsville, Texas.

This belongs to the genus *Cabares*, Biol. Cent. Amer., Lepid., ii, 337, t. 80, figs. 24, 25, 26, 1894. *Distribution*.—Texas, Mexico, Central America, South America, Cuba, Jamaica.

The species may be listed as follows:

icelus	horatius
brizo	<i>virgilius</i>
var. <i>somnus</i>	<i>petronius</i>
callidus	propertius
<i>lacustra</i>	<i>tibullus</i>
burgessi	clitus
persius	tatius
var. <i>pernigra</i>	terentius
var. <i>lucilius</i>	<i>ovidius</i>
var. <i>afranius</i>	<i>naevius</i>
martialis	funeralis
<i>arsonius</i>	tristis
juvenalis	lilium
<i>ennius</i>	pacuvius
	scudder